

Section III: Target Architecture

The target architecture is a description of intent. This is where the Department plans to be over time, the goal of change. It should be emphasized that any change is governed by the business requirements and goals, and not by advances in technology alone. The following chapter will discuss the business and technology drivers that propel change for the Department. The target architecture is not a final plan, but a first phase. The target will change over time as business needs and technology change. It will provide a flexible framework to manage change to the best advantage of the Department, and ultimately, to the Department's customers.

Chapter 8 Business and Technology Change Drivers

Change drivers are external forces that act on the environment and necessitate adaptations to meet the new requirements for performing business functions. They are broken down into two categories, Business drivers, and Technology drivers. These two forces work in a symbiotic way to enhance each other. Advances in technology provide means for more and better services to the customer, which drives business to improve itself over time. New markets and services require technology advances to implement them, catalyzing growth in the technologies available. For the purposes of an EISA, business drivers are more critical, in that cost must be considered in implementation. *Also, any changes to existing systems, or addition of new systems must occur for the sole reason that a business case exists to justify the expenditures. It should be clearly understood that business defines the role of technology, and not the reverse.*

8.1 Business Drivers

In the Federal Government, the primary business drivers are public law (Congressional Acts), Presidential directives, Office of Management and Budget Circulars, and various other official pronouncements and policy statements from the Executive and Legislative branches of the government. There is also a desire within the Department of Commerce to help lead the way by example, both for other public agencies as well as for private industry. This means that new ways of conducting business and new products that are made possible by technological advances are major motivating forces within the Department as well.

The legislative and policy components of the business drivers are as follows:

- *Information Technology Management Review (Clinger-Cohen) Act of 1996*

This Act requires the development and maintenance of IT architecture plans, operational IT plans and cost data, security and contingency plans, and IT training

plans. It also requires the establishment of an IT Review Board to select, control, and evaluate major IT investments.

- *Paperwork Elimination Act of 1996*

All agencies must generally provide for the optional use and acceptance of electronic documents and signatures, and electronic record keeping where practicable, by October 2003.

- *Government Performance and Results Act of 1993*

The Act mandates the development and maintenance of strategic IT plans and performance measures. Any new IT initiatives are required to include measurements which focus on the results of implementation, justifying the cost-benefit analysis.

- *Paperwork Reduction Act of 1980*

This Act requires agencies to become more responsible and publicly accountable for reducing the burden of Federal paperwork on the public. New initiatives are mandated to consider automated and electronic IT solutions to existing manual and paper based products for public access.

- *Office of Management and Budget Circular No. A-130 of 1996*

The circular concerns the importance of evaluation and measurement of IT initiatives. It recommends that agencies seek opportunities to improve the effectiveness and efficiency of its programs through work process redesign and the judicious application of information technology. The circular further recommends the use of cost-benefit analysis to support ongoing management oversight processes, and to conduct post-implementation reviews of IT systems to validate the estimated benefits.

- *Office of Management and Budget Circular No. A-11 (Revised 1999)*

IT budget estimates are the topic of this circular. It requires that all new initiatives be fully supported in the budget process. It raises the level of documentation required to support the budget estimates for new IT systems.

- *Office of Management and Budget Bulletin No. 96-02 of 1995*

This bulletin provides guidance for significantly reducing the number of agency data centers and reducing the total cost of data center operations within government. This planning must be part of developing the overall architecture plan.

- *Office of Management and Budget Memorandum 97-02 of 1996*

This document contains the "Raines' Rules", which document the major criteria for funding investments in major IT systems. These rules must be applied to all major initiatives cataloged in the annual strategic and operational IT plans. They therefore apply to any development arising from the Target architecture, which must also be documented in both the strategic and operational IT plans.

Each of these drivers influence how the Department will conduct its business in the future, and each has an affect on the development of the target architecture that will be used to perform the business functions. A summation of these business drivers would be that automated means are to be used to the maximum extent possible, backed up by a solid business case analysis for deploying these systems. Each system will have performance metrics defined and evaluated on a continual basis to certify that the system is performing up to the requirement of the user community, at a cost that is appropriate for the function. Further, system development must be tied to business needs, and should reuse as much as possible from other existing systems to minimize cost and development time.

8.2 Technology Drivers

The pace of technological change moves much faster than the ability of any organization to keep pace. Most find themselves significantly behind the power curve in many areas of the enterprise. This gap between the current technology level and the leading edge are where the driving forces for changes in technology are found.

The current technology environment is dominated by rapid advances in the following areas:

- Telecommunications advances
Rapid increase in bandwidth and transmission speed has fueled the growth of multimedia applications, including video conferencing and distance learning. As the Internet moves closer to universal broad band technology, the performance of these types of applications will increase. Additionally, the increased performance and capacity is leading to a fusion of voice, data, and video over one network. This will allow the integration of many common office functions such as voice mail, fax, and video conferencing into the standard user desktop. The increased bandwidth and capacity will also allow users to perform tasks more easily from remote locations, allowing widespread use of telecommuting.

- Internet/Intranet
The development of private, secure Internet sites for organizations (called Intranets) has provided a catalyst for deploying enterprise wide applications to users via an internal Web site. The Intranet is protected from, but connected to, the Internet. Firewalls and sophisticated means of user authentication allow business functions to be performed using standard browsers, from any location. The Internet growth also has catalyzed change. Information and services traditionally supplied to customers through paper based systems are now accessible to a broader group of customers through the Internet, and delivery time can be decreased from days to minutes providing better customer service and satisfaction.
- Electronic commerce
E-commerce (electronic commerce or EC) is the buying and selling of goods and services on the Internet, especially the World Wide Web.¹ In the government, E-Commerce provides the means for obtaining licenses, applying for permits, registering for services, submitting forms, and obtaining information. In conjunction with security mechanisms such as Digital signatures, it provides a means for the public to conduct much of the routine business with the government via the Internet. This will reduce costs, expedite processing, and improve customer satisfaction and service.
- Integrated workflow
Workflow is the orderly movement of a process from one step to the next. In administrative systems, it defines each step a task must complete before progressing to the next, and it defines the end point of the process. Integrated workflow allows this information to become part of the system, automatically routing work to the appropriate user or office for completion. The development of a digital workflow allows the entire process to be carried out without any paper being involved. It provides routing information, signature and authorization requirements, plus progress tracking and exception handling. Integrated workflow provides the linkage required to fully automate repetitive tasks, and can be applied to each of the areas to be addressed by this document.
- Digital Signature/Public Key Encryption
Computer security has been a major industry concern since networking began. Data security is an outgrowth of this and the need to authenticate data as being reliable and authentic. It is far to simple to manipulate any type of data, including audio and video, with the sophisticated tools and processors available. As a response to the issue of privacy and information security, public key encryption

¹ whatis.com, Mark van Ketel and Tim D. Nelson, October 14, 1999

has been developed. It is a means of encoding a message that can only be decoded by a user who possesses the correct decoding key. This allows data and information to be transmitted securely over unsecured public networks without fear of illicit use.

Digital signatures are a means of electronically signing a document whereby the authenticity of the signature can be verified, but the signature itself cannot be copied. Additionally, it provides a mechanism for determining if the document has been altered in any way after the signature was applied. This allows secure and confidential applications to be deployed that eliminate the need for pen and ink signatures on paper. Together, digital signatures and public key encryption allow e-commerce to operate with a high measure of security, privacy, and authenticity.

- *Remote/Mobil Computing*

As little as 10 years ago, most computer related tasks had to be performed from devices (PC, dumb terminals) that were physically connected to the local network. This restriction is under continuous assault as wireless communications devices grow in sophistication and reliability. It is now possible to access a corporate Intranet from a small cellular telephone and conduct many standard business functions. It is also possible to connect via cellular modem from a standard laptop computer and have full access to the desktop as if the user was sitting in the office.

This type of access has large implications for a workforce geographically distributed all over the world, often in the field away from PCs and other more traditional entry points to the Internet/Intranet. It means that users can stay connected regardless of location, and can interact with other users and organizations in real time from the field as well as in the office. Special application designs are required for many portable devices now, but this will also change as the technology advances over time.

- *Digital Publishing*

Most documents and reports produced in the last few years have been made available on the Internet. Older documents have also been made available in many cases, with one distinct difference. New documents are written with Web publishing in mind and make use of appropriate tools such as HTML or PDF file formats. Older documents are in paper format and must be scanned from paper (or microfiche) and converted to one of these formats using optical character recognition (OCR) tools to convert the image to actual text. Documents published for the Web from the start are searchable, much smaller, and require no special handling to make available. Scanning and OCR are expensive operations, requiring very labor intensive effort to make available on the Web.

One of the largest single functions of government web sites is to make information available to the public. The use of digital publishing tools from the start will facilitate this process, and make more information available to a wider audience for less cost.

- Platform Independence

Platform independence is the ability to separate applications from the underlying operating system (OS) and hardware. In its idealized form, it means that an application could be moved from one OS/hardware platform to a different one with no reengineering of the code at all. This is still a little off in the future, but the trend is in that direction. User interfaces employing standard Web browsers have already achieved this in that any HTML/Java compliant browser can access the applications with no changes between platforms at all. The user do not need to be concerned using Windows, Unix, or Macintosh systems, the applications supported by the browsers are equally accessible from any of these.

Applications written using standard compliant compilers, or using more recent development tools such as Java and XML have achieved a high level of independence, though some minor reengineering may be require.

The importance of platform independence is that it allows IT managers to make hardware procurement decisions based on the best value for the dollar in the market at the point in time the purchase is made. It does not restrict the choices to only platforms capable of supporting a particular application or system.